

## REMARKS

The Examiner's attention to the application is appreciated. Reconsideration is respectfully requested.

### Specification

The Office Action reminded the Applicant of the proper language and format for an abstract of the disclosure. Applicant has amended the Abstract to better conform to the standards for an abstract. More particularly, the Abstract has been amended to be less than 150 words, to avoid legal phraseology often used in patent claims, to avoid repeating information given in the title, and to avoid using phrases that can be implied. No new matter has been added. This amendment to the abstract is non-substantive in that it does not change the scope of the disclosure or claims but merely meets the guidelines for an abstract.

### Election/Restrictions

In response to the restriction requirement, Applicant affirms the election of Group I, originally-filed claims 1-23 and 45-46 without traverse. The Office Action withdrew Claims 24-44 from consideration. Accordingly, Applicant hereby cancels Claims 24-44 without prejudice.

### Support for Amendments to the Claims

Applicant has amended independent claims 1 and 46 to clarify that which is regarded as the invention. More particularly, Applicant has amended independent Claims 1 and 46 to clarify that the water used in making the treatment fluid has "a magnesium ion concentration of less than 1mM and a calcium ion concentration of less than 2.5 mM." Applicant has further amended Claim 1 to clarify that in the step of adding a breaker moderation, the breaker moderator is added in a sufficient concentration "to reduce the break rate of the fluid compared to a sample of the treatment fluid without the addition of the breaker moderator." Claim 46 has been amended to clarify that in the step of "adding at least one member selected from the group consisting of a source of magnesium ions and a source of calcium ions," the measure is to provide "a magnesium ion concentration of at least 1mM or a calcium ion concentration of at least 2.5 mM or both." Support for these amendments is found throughout the specification, including in Paragraphs 35-38 and 64 and in Figure 2. No new

matter has been added.

Applicant has canceled original independent claims 2 and 45 without prejudice and amended multiple dependent claims 3, 5, 13, 16, 20, and 22 to now depend solely from independent claim 1.

Claims 6 and 10 were amended to merely correct a typographical error, that is, "Claims 4" to Claim 4".

Claim 11 has been amended to depend from independent claim 1 instead of canceled independent claim 2, and to provide an antecedent basis for the crosslinking agent.

Claims 47-59 are new dependent claims, which are presented to help clarify that which the Applicant regards as the invention. Support for the new dependent claims can be found throughout the original specification and in some of the original claims. For example, support for new dependent claims 47, 48, and 57 is found in at paragraphs 39 and 67 and Table 5; support for new dependent claims 49, 51, 58, and 60 is found at paragraph 45 and all the examples; support for new dependent claims 50 and 59 is found at paragraph 19; support for new dependent claim 52 is found at paragraph 46; and support for new dependent claims 53 and 54 is found at paragraph 35; and support for new dependent claims 55 and 56 is found at paragraph 30 and Example 5, specifically paragraphs 68-69. No new matter has been added.

#### Pending Claims

Claims 1, 3-23, and 46-60 are pending in the application.

#### Claim Rejections – 35 USC § 102

Original claims 1-18, 22-23, and 45-46 were rejected under 35 U.S.C. 102(b) as being anticipated by Weaver et al. (U.S. Patent No. 6,488,091). In view of the clarifying amendments to the claims and the following arguments, this rejection is respectfully traversed and reconsideration is requested as to as to the pending claims 1, 3-18, 22-23, and 46.

Weaver et al. does not teach or suggest the method as claimed by applicant, notably including, among other things, the step of forming a treatment fluid comprising: water having a magnesium ion concentration of less than 1mM and a calcium ion concentration of less than 2.5 mM, a polysaccharide, and a breaker comprising at least one member selected from the

group consisting of a source of chlorite ions and a source of hypochlorite ions; and the step of adding a source of magnesium ions or a source of calcium ions.

Further, while the Office Action cites several passages from Weaver et al., the rejection of the original claims appears to depend on the cited language at Column 9, lines 1-31. However, that passage is incomplete and taken out of the full context of the paragraph that begins at Column 8, lines 64 – Column 9, line 31 (*emphasis added*):

**When the preferred crosslinking agent is used, that is, a borate compound, the pH adjusting compound is utilized to elevate the pH of the treating fluid to above about 9.** At that pH, the borate compound crosslinking agent crosslinks the short chain hydrated polymer segments. When the pH of the crosslinked treating fluid falls below about 9, the crosslinked sites are no longer crosslinked. Thus, when the crosslinked fracturing fluid of this invention contacts the subterranean formation being treated, the pH is lowered to some degree which begins the breaking process. In order to cause the fracturing fluid to completely revert to a thin fluid in a short period of time, a delayed delinker capable of lowering the pH of the treating fluid can be included in the treating fluid. *Examples of delayed delinkers which can be utilized include, but are not limited to, various lactones, esters, encapsulated acids and slowly soluble acid generating compounds, oxidizers which produce acids upon reaction with water, water reactive metals such as aluminum, lithium and magnesium and the like.* Of these, the esters are preferred. The delinker is included in the treating fluid in an amount in the range of from about 0% to about 1% by weight of the water therein. **Alternatively, any of the conventionally used delayed breakers employed with metal ion crosslinkers can be utilized, for example, oxidizers such as sodium chlorite, sodium bromate, sodium persulfate, ammonium persulfate, encapsulated sodium persulfate, potassium persulfate, or ammonium persulfate and the like as**

*well as magnesium peroxide. Enzyme breakers that may be employed include alpha and beta amylases, amyloglucosidase, invertase, maltase, cellulase and hemicellulase.* The specific breaker or delinker utilized, whether or not it is encapsulated, as well as the amount thereof employed will depend upon the breaking time desired, the nature of the polymer and crosslinking agent, formation characteristics and conditions and other factors.

The first part of the paragraph in Weaver et al. beginning at Column 8, line 64, relates specifically to "**When the preferred crosslinking agent is used, that is, a borate compound ...**" In this case, Weaver et al. discloses several examples of the "delayed delinker" that can be used when the crosslinking agent is a borate compound, including "*water reactive metals such as aluminum, lithium and magnesium.*" Assuming that water reactive metal magnesium would be a source of magnesium ions, the other examples of the "delayed delinker" do not include either chlorite or hypochlorite. Thus, this first part of the cited paragraph in Weaver et al. does not teach the claims by Applicant for the use of a source of chlorite or hypochlorite together with a source of magnesium ions (or calcium ions).

In contrast to the first part of the cited paragraph, the second part of the cited paragraph in Weaver et al., which begins at Column 9, line 18, relates "**Alternatively**" to the use "**any of the conventionally used delayed breakers employed with metal ion crosslinkers ...**" These are disclosed only in the alternative to "**When the preferred crosslinking agent is used, that is, a borate compound ...**" Thus, Weaver et al. does not teach that for a borate crosslinking agent any of its "delayed delinkers" are utilized together with any "conventionally used delayed breakers employed with metal ion crosslinkers." Again, assuming that water reactive metal magnesium would be a source of magnesium ions, the first and second parts of the cited paragraph in Weaver et al., which are in the alternative, do not teach the claims by Applicant for the use of a source of chlorite or hypochlorite together with a source of magnesium ions (or calcium ions).

In the second part of the paragraph, which at Column 9, line 18, Weaver et al. teaches that the "any of the conventionally delayed breakers employed with metal ion crosslinkers" are, *for example, oxidizers such as sodium chlorite, sodium bromate, sodium persulfate,*

*ammonium persulfate, encapsulated sodium persulfate, potassium persulfate, or ammonium persulfate and the like as well as magnesium peroxide. Enzyme breakers that may be employed include alpha and beta amylases, amyloglucosidase, invertase, maltase, cellulase and hemicellulase.* However, Weaver et al. does not teach using “any of the conventionally used delayed breakers” that it lists as examples in combination with one another. Further, Weaver et al. does not teach specifically selecting two particular members from this lengthy list of examples. Further, Weaver et al. does not teach the benefits or criticality of specifically selecting chlorite (and/or hypochlorite) together with a source of magnesium ions (and/or calcium) in the concentrations as set forth in Applicant’s claims. Moreover, Weaver et al. does not teach that magnesium ions (and/or calcium ions) can be used as a breaker modifier to modify the break rate for a treatment fluid using a chlorite (or hypochlorite) breaker. Thus, the second part of this cited paragraph in Weaver does not teach the claims by Applicant for the use of a source of chlorite or hypochlorite and a source of magnesium ions in specific combination and in the stated concentration.

Furthermore, in addition to the foregoing arguments, it is well known that sodium chlorite in water initially has a pH of about 9, which is known to decompose at lower pH. See Weaver et al., 8, lines 64 – Column 9, line 6. In this regard, magnesium peroxide is insoluble in water (except in an acidic solution, in which case it decomposes). E.g., *Hawley’s Condensed Chemical Dictionary, Fourteenth Edition*, Ed. Richard J. Lewis, Sr., p. 689. Thus, adding magnesium peroxide to a solution of sodium chlorite would appear to be an unlikely combination to a person of skill in the art, and there is no teaching in Weaver et al. of the unexpected benefits that can be achieved by doing so as taught by Applicant. In addition, Weaver et al. does not teach how to use any such hypothetical combination.

In view of the foregoing, Applicant respectfully requests that the rejection of pending Claims 1-18 and 45-46 be withdrawn.

Dependent claims are independently patentable

Dependent Claims 22 and 23 specify that “the fluid further comprises a pH adjusting agent present in a sufficient concentration to adjust the pH of the fluid to be at least 10.” Thus, a person of skill in the art would not consider magnesium peroxide, which is insoluble except in acidic solution, to be a “source of magnesium ions” in an alkaline solution, especially at a pH of at least 10 as specifically provided for by these dependent claims. Thus,

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the subject matters of dependent claims 22 and 23 (and similar new dependent claims 47, 48, and 57) are independently patentable.

Dependent Claim 56 specifies that “the crosslinking agent is a borate crosslinking agent.” As discussed in detail above, Weaver et al. does not teach using chlorite or magnesium peroxide, either separately or in combination, with a borate crosslinking agent, which requires a high pH. Thus, the subject matter of dependent claim 56 is independently patentable.

#### Claim Rejections – 35 USC § 103

Claims 19-21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Weaver et al. (U.S. Patent No. 6,488,091) in view of Dawson et al. (U.S. Publication No. 2002/0125012). This rejection is respectfully traversed and reconsideration is requested.

As discussed above, Weaver et al. does not teach or suggest Applicant’s invention as defined in the independent claims. Similarly, the hypothetical combination of Weaver et al. with Dawson et al. does not teach or suggest the benefits or criticality of specifically selecting chlorite (or hypochlorite) together with a source of magnesium ions (or calcium ions). Further, the hypothetical combination of Weaver et al. with Dawson et al. does not teach or suggest the criticality and benefits of the combination as claimed among a wide range of possibilities. Furthermore, the hypothetical combination does not teach or suggest the steps and concentrations as defined in the claims.

#### Conclusion

Applicant respectfully requests reconsideration and allowance of all pending claims 1, 3-23, and 46-60. If a telephone conference might expedite the prosecution of this application, the undersigned can normally be reached at the telephone number below.

The Commissioner of Patents is hereby authorized to charge any fees or overpayments to Deposit Account No. 50-3037. A duplicate copy of this fee authorization sheet is enclosed for this purpose.

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Todd E. Albanesi  
\_\_\_\_\_  
Name of Applicant, Assignee or Registered Representative  
  
\_\_\_\_\_  
Signature

February 14, 2006  
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Date of Signature

Respectfully submitted,



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Todd E. Albanesi, Reg. No. 36,426  
CRUTSINGER & BOOTH, LLC  
1601 Elm Street, Suite 1950  
Dallas, Texas 75201-4744  
(214) 220-0444; Fax (214) 220-0445

Attorneys for Applicant

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